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jc960 U.S. PTO

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A

Practitioner's Docket No. 50640

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): **Charles R. SZMANDA, Peter TREFONAS, III, Richard C. HEMOND,  
Mark S. THIRSK, Leo L. LINEHAN and Anthony ZAMPINI**

**WARNING:** 37 CFR 1.41(a)(1) points out:

*"(a) A patent is applied for in the name or names of the actual inventor or inventors.*

*(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(i) is filed supplying or changing the name or names of the inventor or inventors."*

For (title): **A METHOD AND SYSTEM FOR RECYCLING MATERIALS**

**CERTIFICATION UNDER 37 C.F.R. 1.10\***

*(Express Mail label number is **mandatory**.)*

*(Express Mail certification is optional.)*

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date November 28, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL770089936US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Deanna M. Rivernider

*(type or print name of person mailing paper)*

Deanna M. Rivernider  
Signature of person mailing paper

**WARNING:** Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence

**\*WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).  
"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

jc912 U.S. PTO  
09/23746  
11/28/00

## 1. Type of Application

This new application is for a(n)

*(check one applicable item below)*

☒ Original (nonprovisional)

☐ Design

☐ Plant

**WARNING:** *Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

**WARNING:** *Do not use this transmittal for the filing of a provisional application.*

**NOTE:** *If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.*

☐ Divisional.

☐ Continuation.

☐ Continuation-in-part (C-I-P).

## 2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

**NOTE:** *A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. Each prior application must also be:*

*(i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or*

*(ii) Complete as set forth in § 1.51(b); or*

*(iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or*

*(iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(l) within the time period set forth in § 1.53(f)*

37 CFR 1.78(a)(1).

**NOTE** *If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

**WARNING:** *If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

**WARNING:** *When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application **must** be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).*

☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

### 3. Papers Enclosed

#### A. Required for Filing Date under 37 C.F.R. 1.53(b) (Regular) or 37 C.F.R. 1.153 (Design) Application

7 Pages of Specification (including cover sheet)  
3 Pages of Claims  
1 Sheets of Drawing

☐ Formal  
☐ Informal

#### B. Other Papers Enclosed

1 Pages of Abstract  
\_\_\_\_\_ Other

**WARNING:** ***DO NOT** submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 C.F.R. 1.84, see Notice of March 9, 1988 . . . (1990 O.G. 57-62).*

**NOTE:** *"Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page." 37 C.F.R. 1.84(c)*

*(complete the following, if applicable)*

☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

#### 4. Additional Papers Enclosed

- ☐ Preliminary Amendment
- ☐ Information Disclosure Statement (37 C.F.R. 1.98)
- ☐ Form PTO-1449
- ☐ Citations
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
- ☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative
- ☐ Special Comments
- ☐ Other:

#### 5. Declaration or Oath

**NOTE:** *A newly executed declaration is not required in a continuation or divisional application provided the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47 then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 CFR 1.63(d).*

**NOTE:** *A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and the residence, post office address and country of citizenship of each inventor and state whether the inventor is a sole or joint inventor. 37 CFR 1.63(a)(1)-(4).*

☐ Enclosed

Executed by

(check all applicable boxes)

- ☐ inventor(s).
- ☐ legal representative of inventor(s). 37 CFR 1.42 or 1.43.
- ☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.
- ☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

☒ Not Enclosed.

**NOTE:** *Where the filing is a completion in the U.S. of an International Application, or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED*

- ☐ Application is made by a person authorized under 37 C.F.R. 1.41(c) on behalf of all the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e), can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

☐ Showing that the filing is authorized.  
(not required unless called into question. 37 CFR 1.41(d))

## 6. Inventorship Statement

**WARNING:** If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted

The inventorship for all the claims in this application are:

☐ The same.  
**or**  
☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,  
☐ is submitted.  
☐ will be submitted.

## 7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).

☒ English  
☐ Non-English  
  
☐ The attached translation includes a statement that the translation is accurate. 37 C.F.R. 1.52(d).

## 8. Assignment

☒ An assignment of the invention to \_\_\_\_\_  
  
☐ is attached. A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.  
☐ was filed in the parent application  
☒ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters—one for the application and one for the assignment" Notice of May 4, 1990 (1114 O.G. 77-78).

**WARNING:** A newly executed "STATEMENT UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

9. **Certified Copy**

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
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from which priority is claimed

- ☐ is enclosed.  
☐ was filed.  
☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. **Fee Calculation (37 C.F.R. 1.16)**

A. ☒ Regular application

CLAIMS AS FILED

Claims	Number Filed	Basic Fee Allowance	Number Extra	Rate	Basic Fee 37 C.F.R. 1.16(a) \$710.00
<b>Total Claims (37 CFR 1.16(c))</b>	18	- 20 =	0	x \$ 18.00	\$0
<b>Independent Claims (37 CFR 1.16(b))</b>	2	- 3 =	0	x \$78.00	\$0
<b>Multiple Dependent Claim(s), if any (37 CFR 1.16(d))</b>			+	\$260.00	\$0

- ☐ Amendment canceling extra claims is enclosed.  
☐ Amendment deleting multiple-dependencies is enclosed.  
☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency 37 CFR 1.16(d).

Filing Fee Calculation \$ 710.00

- B. ☐ Design application  
(\$330.00—37 CFR 1.16(f))  
Filing Fee Calculation \$\_\_\_\_\_
- C. ☐ Plant application  
(\$540.00—37 CFR 1.16(g))  
Filing Fee Calculation \$\_\_\_\_\_

# 11. Small Entity Statement(s)

- ☐ Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

## WARNING:

*"Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 CFR 1.28(a)(2).*

*(complete the following, if applicable)*

- ☐ Status as a small entity was claimed in prior application \_\_\_\_\_, filed on \_\_\_\_\_ from which benefit is being claimed for this application under:

35 U.S.C. § ☐ 119(e),  
☐ 120,  
☐ 121,  
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☐ A copy of the statement in the prior application is included.  
Filing Fee Calculation (50% of A, B or C above) \$\_\_\_\_\_

**NOTE:** Any excess of the full fee paid will be refunded if a small entity status is established refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 CFR 1.28(a).

# 12. Request for International-Type Search (37 C.F.R. 1.104(d)) *(complete, if applicable)*

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

**13. Fee Payment Being Made at This Time**

☒ Not Enclosed

☒ No filing fee is to be paid at this time.  
(This and the surcharge required by 37 C.F.R. 1.16(e) can be paid subsequently.)

☐ Enclosed

☐ Filing fee \$ \_\_\_\_\_

☐ Recording assignment  
(\$40.00; 37 C.F.R. 1.21(h))  
(See attached "COVER SHEET FOR  
ASSIGNMENT ACCOMPANYING NEW  
APPLICATION.") \$ \_\_\_\_\_

☐ Petition fee for filing by other than  
all the inventors or person on behalf  
of the inventor where inventor  
refused to sign or cannot be reached  
(\$130.00; 37 C.F.R. 1.47 and 1.17(i)) \$ \_\_\_\_\_

☐ For processing an application with a  
specification in a non-English language  
(\$130.00; 37 C.F.R. 1.52(d) and 1.17(k)) \$ \_\_\_\_\_

☐ Processing and retention fee  
(\$130.00; 37 C.F.R. 1.53(d) and 1.21(l)) \$ \_\_\_\_\_

☐ Fee for international-type search report  
(\$40.00; 37 C.F.R. 1.21(e)) \$ \_\_\_\_\_

*NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(f) and this, as well as the changes to 37 CFR 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(f).*

Total Fees Enclosed \$ \_\_\_\_\_

**14. Method of Payment of Fees**

☐ Check in the amount of \$ \_\_\_\_\_

☐ Charge Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_.  
A duplicate of this transmittal is attached.

**15. Authorization to Charge Additional Fees**

**WARNING:** If no fees are to be paid on filing, the following items should not be completed.

**WARNING:** Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

☐ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. \_\_\_\_\_.



- ☐ 37 C.F.R. 1.16(a), (f) or (g) (filing fees)  
☐ 37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

*NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.*

- ☐ 37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)  
☐ 37 CFR 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).  
☐ 37 C.F.R. 1.17 (application processing fees)

*NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 CFR 1.136(a)(3).*

- ☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

*NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b)).*

*NOTE: 37 CFR 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 CFR 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.*

## 16. Instructions as to Overpayment

*NOTE: ". . . Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 CFR 1.26(a).*

☐ Credit Account No. \_\_\_\_\_

☐ Refund

  
**SIGNATURE OF PRACTITIONER**

Reg. No. 42,378

S. Matthew Cairns

(type or print name of practitioner)

c/o EDWARDS & ANGELL, LLP  
 Dike, Bronstein, Roberts & Cushman, IP Group

Tel. No.: (508) 229-7545

130 Water Street

P.O. Address

Customer No.:

Boston, MA 02109

☐ **Incorporation by reference of added pages**

*(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)*

- ☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added \_\_\_\_\_

- ☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added \_\_\_\_\_

- ☐ Plus added pages deleting names of inventor(s) named on prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added \_\_\_\_\_

- ☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added \_\_\_\_\_

☒ **Statement Where No Further Pages Added**

*(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)*

- ☒ This transmittal ends with this page.

Express Mail Label No. EL770089936US  
Docket No. 50640

**U.S. PATENT APPLICATION**

Title: **A METHOD AND SYSTEM FOR RECYCLING MATERIALS**

Inventors: Charles R. SZMANDA  
Peter TREFONAS, III  
Richard C. HEMOND  
Mark S. THIRSK  
Leo L. LINEHAN  
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Boston, MA 02109  
Telephone: (508) 229-7545

**A METHOD AND SYSTEM FOR  
RECYCLING MATERIALS**

**BACKGROUND**

The following invention relates to a system and method for recycling and, in particular, a system and method for recycling materials used in a manufacturing process.

Generally, raw materials costs comprise a substantial portion of the cost of manufacturing a particular product. For example, a substantial cost in the production of semiconductors is the cost of the chemicals used during the manufacturing process. Certain chemicals, such as photoresist, comprise a large percentage of this chemical cost and any significant change in the cost of these chemicals will have an impact on the overall cost of the manufactured product.

Many of the chemicals used for semiconductor production are not completely exhausted during the manufacturing process. In fact, the waste stream generated during manufacturing includes a sizeable portion of chemicals such as photoresist and developer. Prior art techniques exist for processing such waste streams to retrieve reusable chemicals contained therein. For example, U.S. Patent No. 5,084,483 issued to Yamashita is directed to a method for recovering and reusing resist composition scatters in silicon wafer coating. The recovery of the chemicals from the waste stream and their reuse would have a material impact on manufacturing costs.

Although techniques exist for recovering and reusing chemicals from the waste streams of semiconductor manufacturing, these techniques are rarely used and thus have minimal impact on the cost of chemicals used in the manufacturing process. The semiconductor manufacturers themselves have little incentive to reprocess their waste streams because they lack the expertise to do so and such efforts would be a distraction to their main business. Furthermore, the cost to implement a recovery/reuse facility may not be economically feasible if such a facility is to be

used to reprocess just the manufacturers own waste streams. The chemical manufacturers also have little interest in promoting chemical recycling as this would reduce their profit margin on new chemicals. Thus, the chemicals contained in waste streams are not recovered and, as a result, the potential costs saving from their reuse is lost.

Accordingly, it is desirable to provide a system and method for recycling materials contained in waste streams generated as a by-product to a manufacturing process.

### **SUMMARY OF THE INVENTION**

The present invention is directed to overcoming the drawbacks of the prior art. Under the present invention a system and method is provided for recycling raw materials from a plurality waste streams generated by waste stream providers and includes a waste stream monitoring module for monitoring the plurality of waste streams and determining an amount of reusable raw materials contained in each of the plurality of waste streams. Also included is a reusable materials database for storing the amount of each of the raw materials contained in any of the plurality of waste streams. A user operating an access device communicates with the reusable materials database for viewing the amount of each of the raw materials.

In an exemplary embodiment the reusable materials database includes a price for each of said raw materials.

In another exemplary embodiment, the user issues a purchase request for a specified amount of at least one of the raw materials according to the price indicated in the reusable materials database.

In yet another exemplary embodiment, a waste purchasing module is included for receiving the purchase request and issuing a purchase order to at least one of the waste stream providers for fulfilling the purchase request. Upon receiving the purchase order the at least one

of the waste stream providers delivers at least one of said plurality of waste streams to a recovery plant wherein the recovery plant recovers the specified amount of at least one of the raw materials. Finally, the specified amount of at least one of the raw materials is transported to a location indicated by the user.

Accordingly, a system and method is provided for recycling materials contained in a plurality of waste streams generated by manufacturing processes.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts that will be exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims. Other features and advantages of the invention will be apparent from the description, the drawings and the claims.

### **DESCRIPTION OF THE DRAWINGS**

For a fuller understanding of the invention, reference is made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a block diagram of the recycling system of the present invention.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring now to FIG. 1, there is shown a recycling system 1 for recycling waste from a plurality of waste stream providers 3, in accordance with the present invention. Recycling system 1 includes a waste stream monitoring module 5 that communicates with waste stream providers 3 via a waste stream provider interface 7 for the purpose of monitoring the waste generated by each of waste stream providers 3 and determining the reusable materials contained therein. Waste stream providers 3 may communicate with waste stream provider interface 7 using any known methods, mediums or protocols including, by way of non-limiting example, the

Internet. Waste stream monitoring module 5 may determine the reusable contents of the waste stream using any number of known methods for monitoring and analyzing the contents of waste. For example, if one of waste stream providers 3 uses, for instance, resist coating and development equipment to produce wafers, waste stream monitoring module 5 would then monitor the number of wafers produced by the equipment and calculate, based on predetermined relationships, the amount of raw materials, such as photoresist and developer, that is expelled by the wafer stepper for the given number of wafers produced. Alternatively, a sensor may be located in the waste stream produced by the wafer stepper for monitoring the volume and contents of the waste stream. The sensor then relays this information to waste stream monitoring module 5 which then calculates the amount of reusable raw materials contained in the waste stream. Examples of sensors that may be used to monitor the contents of a waste stream using well known techniques include capacitive level sensors, mechanical level sensors, scales and load cells. Similarly, any other method for monitoring any type of waste stream and analyzing its contents may be used with the results of such analysis being provided to waste stream monitoring module 5.

Waste stream monitoring module 5 then communicates to reusable materials database 9 the amount of reusable materials contained in the waste streams generated by each of waste stream providers 3. A price is determined for each of the recycled materials stored in reusable materials database 9 based on all relevant factors including, but not limited to, the price of the corresponding new materials, the available supply and quality of the recycled material. Thus, reusable materials database 3 contains a searchable catalog of all the reusable materials contained in the waste streams generated by waste stream providers 3.

A user operating a user access device 11, for example a personal computer, may query reusable materials database 9, via user access interface 13, to determine whether a desired

material, for example photoresist, is available in recycled form from any of waste stream providers 3 and, if so, in what quantity and at what price. If the user locates in reusable materials database 9 the desired recycled material at an acceptable price, the user issues a purchase request to user access interface 13 for a specified amount of the desired material. User access interface 13 forwards the purchase request to a waste purchasing module 15. Based on the material and quantity specified in the purchase order, waste purchasing module 15 accesses reusable materials database 9 to determine which of waste stream providers 3 is the most suitable source for the specified recycled material. Upon selecting one of waste stream providers 3, waste purchasing module 15 issues a purchase order, via waste stream provider interface 7, to the one of waste stream providers 3 for the waste stream from which the specified materials are to be recovered.

Upon receiving the purchase order, the one of waste stream providers 3 ships the specified waste stream to a recovery plant 17. The waste stream is shipped using known techniques that prevent environmental contamination and/or decomposition of the desired materials. After shipping the waste stream to recovery plant 17, the one of waste stream provider 3 notifies waste purchasing module 15 that the waste stream containing the desired materials was shipped and waste purchasing module 15 then updates reusable materials database 9 to reflect the change in availability of the particular material.

Recovery plant 17 reprocesses the waste stream and recovers from the waste stream the materials specified by the user in the purchase request. The recovery process uses known industrial methods designed to restore the materials recovered from the waste stream. In one embodiment, the materials are restored to their original specifications that may include, by way of non-limiting example, the materials' sensitivity, viscosity, thickness, metal ion concentration and film thickness. Alternatively, the materials may be restored to revised specifications that render the material suitable for use in certain applications. The determination of whether to



restore the materials to the original or revised specification may be made based on the requirements of the user as specified in the purchase request. In another embodiment, recovery plant 17 separates the waste stream into its constituents, purifies them, re-blends them and adds some new raw materials, as required, to produce recycled materials conforming either to their original or revised specifications.

In yet another embodiment, recovery plant 17 separates the waste stream into common chemical components and combines the chemical components to form a new raw material other than the original raw materials from which the particular waste stream was generated. Forming the new raw material from the waste stream may be desirable in cases where the original raw materials are complex and difficult to recover from the waste stream.

In an exemplary embodiment, waste stream providers 3 monitor the batch composition of the original raw materials that generated each particular waste stream. The batch composition information indicates various characteristics of the original raw materials including, by way of non-limiting example, the quality of such raw materials. Waste stream providers 3 provide to system 1 via waste stream provider interface 7 the batch composition information which is used by waste stream monitoring module 5 to determine the particular raw materials that can be recovered from a particular waste stream the most efficiently. For example, if the batch composition information associated with a particular waste stream indicates that the original raw materials that generated the waste stream were of a poor quality, waste stream monitoring module 5 may then determine that a new and less complex raw material could be more efficiently recovered from the particular waste stream. Waste stream monitoring module 5 then communicates the type and quantity of recoverable raw materials to reusable materials database 9, as described above.

Finally, the recycled materials are then shipped from recovery plant 17 to a location 19 designated by the user thereby fulfilling the user's purchase request. In one embodiment, the user is the one of waste stream providers 3 that generated the waste stream from which the recycled materials were recovered.

Accordingly, a system and method is provided for recycling materials contained in a plurality of waste streams generated by manufacturing processes. The system of the present invention analyzes the contents of the waste streams to determine what reusable materials are contained therein and maintains a listing of such reusable materials. A user may access the system to locate desirable recycled materials that are recoverable from various waste streams and to purchase the desired materials. Thus, by recovering and re-distributing materials from waste streams, the system of the present invention helps reduce the overall cost of raw materials used in a particular manufacturing process.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in carrying out the above process, in a described product, and in the construction set forth without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

**CLAIMS**

1. A system for recycling raw materials from a plurality waste streams generated by waste stream providers, comprising:

a waste stream monitoring module for monitoring said plurality of waste streams and determining an amount of reusable raw materials contained in each of said plurality of waste streams;

a reusable materials database for storing said amount of each of said raw materials contained in any of said plurality of waste streams; and

an access device in communications with said reusable materials database, said access device being operable by a user for viewing said amount of each of said raw materials.

2. The system of claim 1, wherein said reusable materials database includes a price for each of said raw materials.

3. The system of claim 2, wherein said user issues a purchase request for a specified amount of at least one of said raw materials according to said price.

4. The system of claim 3, further comprising a waste purchasing module receiving said purchase request and issuing a purchase order to at least one of said waste stream providers for fulfilling said purchase request.

5. The system of claim 4, further comprising a recovery plant for receiving at least one of said plurality of waste streams from said at least one of said waste stream providers, said recovery plant recovering said specified amount of at least one of said raw materials.

6. The system of claim 5, wherein said specified amount of at least one of said raw materials is transported to a location indicated by said user.

7. The system of claim 5, wherein said waste purchasing module updates said reusable materials database based on the receipt of said at least one of said plurality of waste streams from said at least one of said waste stream providers.

8. The system of claim 1, wherein one of said plurality of waste streams was generated from at least one original raw material and said reusable raw material is different than said original raw material.

9. The system of claim 8, wherein said waste stream monitoring module receives batch composition information associated said one of said plurality of waste streams and said waste stream monitoring module determines said amount of reusable material based on said batch composition information.

10. A method for recycling raw materials from a plurality waste streams generated by waste stream providers, comprising the steps of:

monitoring said plurality of waste streams;

determining an amount of reusable raw materials contained in each of said plurality of waste streams;

storing in a reusable materials database said amount of each of said raw materials contained in any of said plurality of waste streams; and

viewing said amount of each of said raw materials in said reusable materials database.

11. The method of claim 10, wherein said reusable materials database includes a price for each of said raw materials.

12. The method of claim 11, further comprising the step of:

receiving a purchase request for a specified amount of at least one of said raw materials according to said price.

13. The method of claim 12, further comprising the step of:  
issuing a purchase order to at least one of said waste stream providers for fulfilling said purchase request.
14. The method of claim 13, further comprising the steps of:  
receiving at a recovery plant at least one of said plurality of waste streams from said at least one of said waste stream providers and  
recovering said specified amount of at least one of said raw materials.
15. The method of claim 14, further comprising the step of:  
transporting said specified amount of at least one of said raw materials to a location indicated in said purchase request.
16. The method of claim 14, further comprising the step of:  
updating the reusable materials database based on the receipt of said at least one of said plurality of waste streams from said at least one of said waste stream providers.
17. The method of claim 10, wherein one of said plurality of waste streams was generated from at least one original raw material and said reusable raw material is different than said original raw material.
18. The method of claim 17, further comprising the steps of:  
receiving batch composition information associated said one of said plurality of waste streams; and  
8 determining said amount of reusable material based on said batch composition information.

**ABSTRACT**

A system and method is provided for recycling raw materials from a plurality waste streams generated by waste stream providers and includes a waste stream monitoring module for monitoring the plurality of waste streams and determining an amount of reusable raw materials contained in each of the plurality of waste streams. Also included is a reusable materials database for storing the amount of each of the raw materials contained in any of the plurality of waste streams. A user operating an access device communications with the reusable materials database for viewing the amount of each of said raw materials.

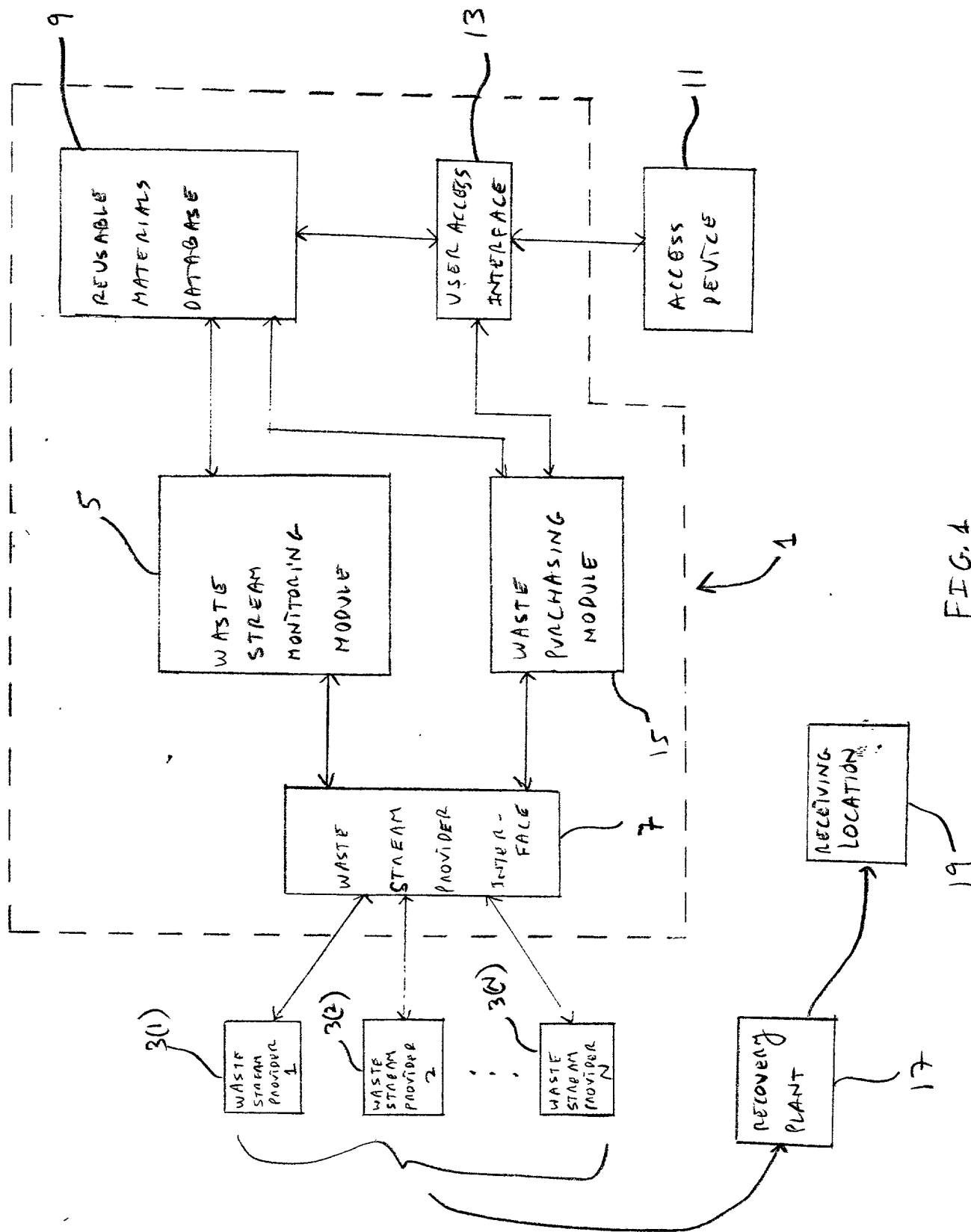


FIG. 4